

MAXXESHOP3D

Advanced Level 3D Printing & Design Year Program

Indicative Years 9-10

Project-based, technically demanding learning with stronger enterprise, documentation and production planning.



Australian-style weekly lesson sequencing for a full school year

Skill Pathway

Expert

Advanced

Intermediate

Developer

Beginner

Advanced Level • Full-Year Lesson Program

Indicative Years 9–10

Project-based, technically demanding learning with stronger enterprise, documentation and production planning.

Program overview

This program resembles a strong secondary elective or STEM unit pathway. Students work with briefs, constraints, testing and communication in more professional ways, including enterprise and sustainability thinking.

Indicative year band	Indicative Years 9–10
Suggested lesson duration	70–90 minutes
Curriculum focus	AC9TDE10K01–K03, AC9TDE10P01–P05 (indicative band alignment where offered)
General capabilities	Literacy, Numeracy, Critical and Creative Thinking, Personal and Social capability, Ethical Understanding, Intercultural Understanding
Term structure	4 terms • 8 core weekly lessons per term • flexible extra weeks left available for local school calendars

Term 1 • Advanced Design Practice

Advanced Level • Term 1

Advanced Design Practice

8 core weekly lessons plus flexible school weeks for interruptions, excursions and assessment

Week 1 Innovation, Enterprise and Modern Manufacturing

Week 2 Risk, Safety and Production Culture

Week 3 Design Thinking for Complex Problems

Week 4 Research Methods and User Evidence

Week 5 Technical Drawings and Communication

Week 6 Precision Modelling Strategies in Tinkercad

Week 7 Project Scoping and Resource Planning

Week 8 Term 1 Client Pitch

Essential question	How do professional designers work within evidence, constraints and stakeholders?
Likely term outcome	formal design proposal, iterative prototype evidence and criteria-based evaluation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 1 • Week 1: Innovation, Enterprise and Modern Manufacturing

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind innovation, enterprise and modern manufacturing and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Innovation, Enterprise and Modern Manufacturing" inside the term theme of advanced design practice. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

The history of manufacturing shows repeated change: hand tools, mechanisation, assembly lines, CNC machining and then digital fabrication. 3D printing sits inside that longer story of production becoming faster, more flexible and more customisable.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Innovation, Enterprise and Modern Manufacturing" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 1 • Week 2: Risk, Safety and Production Culture

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind risk, safety and production culture and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Make safety the main teaching focus: identify hazards, rehearse shutdown routines, discuss hot surfaces and moving parts, and record classroom expectations before

	any hands-on activity.
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Teacher note

This week's lesson positions "Risk, Safety and Production Culture" inside the term theme of advanced design practice. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

Safety routines are a real part of design and technology work. Historically, industries improved safety after recognising that good systems protect people, reduce downtime and improve quality.

Discussion prompts

- Why do strong routines matter even when a classroom printer seems quiet and safe?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Risk, Safety and Production Culture" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 1 • Week 3: Design Thinking for Complex Problems

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind design thinking for complex problems and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or

	clean-up.
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Teacher note

This week's lesson positions "Design Thinking for Complex Problems" inside the term theme of advanced design practice. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Design Thinking for Complex Problems" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 1 • Week 4: Research Methods and User Evidence

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind research methods and user evidence and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful

	workstation behaviour and safe handling of sharp tools used for print removal or clean-up.
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Teacher note

This week's lesson positions "Research Methods and User Evidence" inside the term theme of advanced design practice. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- How do we avoid designing only for ourselves?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Research Methods and User Evidence" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 1 • Week 5: Technical Drawings and Communication

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind technical drawings and communication and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful

	workstation behaviour and safe handling of sharp tools used for print removal or clean-up.
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Teacher note

This week's lesson positions "Technical Drawings and Communication" inside the term theme of advanced design practice. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Technical Drawings and Communication" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 1 • Week 6: Precision Modelling Strategies in Tinkercad

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind precision modelling strategies in tinkercad and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed

	prints, projector/display, internet-connected devices, Tinkercad accounts, mouse if available
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Precision Modelling Strategies in Tinkercad" inside the term theme of advanced design practice. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Precision Modelling Strategies in Tinkercad" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 1 • Week 7: Project Scoping and Resource Planning

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind project scoping and resource planning and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management,

	sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Project Scoping and Resource Planning" inside the term theme of advanced design practice. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Project Scoping and Resource Planning" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 1 • Week 8: Term 1 Client Pitch

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind term 1 client pitch and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	No prior lesson knowledge is required beyond classroom expectations and curiosity.

Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Term 1 Client Pitch" inside the term theme of advanced design practice. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

Professional designers rarely work in isolation; they work with clients, communities or users. Listening well has always mattered because poor assumptions lead to poor products.

Discussion prompts

- How do we avoid designing only for ourselves?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Term 1 Client Pitch" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 2 • Engineering and Manufacture

Advanced Level • Term 2

Engineering and Manufacture

8 core weekly lessons plus flexible school weeks for interruptions, excursions and assessment

Week 1 Additive vs Subtractive Manufacturing

Week 2 Manufacturing Constraints and Tolerances

Week 3 DfAM: Designing for Additive Manufacture

Week 4 Print Orientation as an Engineering Decision

Week 5 Assemblies, Serviceability and Repair

Week 6 Rapid Prototyping and Iteration Cycles

Week 7 Costing, Waste and Production Efficiency

Week 8 Term 2 Design Review

Essential question	How does manufacturing method shape the product we can realistically make?
Likely term outcome	formal design proposal, iterative prototype evidence and criteria-based evaluation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 2 • Week 1: Additive vs Subtractive Manufacturing

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind additive vs subtractive manufacturing and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Additive vs Subtractive Manufacturing" inside the term theme of engineering and manufacture. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

For centuries, people mainly made objects by carving, machining or cutting material away. Additive methods became attractive because they can produce complex shapes and low-volume custom parts with much less tooling.

Discussion prompts

- Why would an engineer still choose machining or laser cutting if 3D printing is available?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Additive vs Subtractive Manufacturing" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 2 • Week 2: Manufacturing Constraints and Tolerances

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind manufacturing constraints and tolerances and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, calipers or rulers, sample test parts
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week’s lesson positions “Manufacturing Constraints and Tolerances” inside the term theme of engineering and manufacture. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

Precision became more important as machines and interchangeable parts became central to manufacturing. The idea of tolerance sits behind everything from screws that fit properly to machines that can be repaired.

Discussion prompts

- Why can two parts look correct on screen but fail to fit in real life?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes “Manufacturing Constraints and Tolerances” feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 2 • Week 3: DfAM: Designing for Additive Manufacture

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind dfam: designing for additive manufacture and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "DfAM: Designing for Additive Manufacture" inside the term theme of engineering and manufacture. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "DfAM: Designing for Additive Manufacture" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 2 • Week 4: Print Orientation as an Engineering Decision

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind print orientation as an engineering decision and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or

	clean-up.
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Teacher note

This week's lesson positions "Print Orientation as an Engineering Decision" inside the term theme of engineering and manufacture. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Print Orientation as an Engineering Decision" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 2 • Week 5: Assemblies, Serviceability and Repair

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind assemblies, serviceability and repair and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful

	workstation behaviour and safe handling of sharp tools used for print removal or clean-up.
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Teacher note

This week's lesson positions "Assemblies, Serviceability and Repair" inside the term theme of engineering and manufacture. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Assemblies, Serviceability and Repair" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 2 • Week 6: Rapid Prototyping and Iteration Cycles

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind rapid prototyping and iteration cycles and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display

Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.
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Teacher note

This week's lesson positions "Rapid Prototyping and Iteration Cycles" inside the term theme of engineering and manufacture. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

Many famous designs only succeeded after repeated testing and revision. Engineering history rewards teams that treat failures as information, not embarrassment.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Rapid Prototyping and Iteration Cycles" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 2 • Week 7: Costing, Waste and Production Efficiency

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind costing, waste and production efficiency and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed

	prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Costing, Waste and Production Efficiency" inside the term theme of engineering and manufacture. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Costing, Waste and Production Efficiency" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 2 • Week 8: Term 2 Design Review

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind term 2 design review and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students draw on Term 1 foundations and a shared design vocabulary from earlier lessons.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability

Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Term 2 Design Review" inside the term theme of engineering and manufacture. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Term 2 Design Review" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 3 • Applied Problem Solving

Advanced Level • Term 3

Applied Problem Solving

8 core weekly lessons plus flexible school weeks for interruptions, excursions and assessment

Week 1 Materials Selection and Performance

Week 2 Quality Assurance and Defect Analysis

Week 3 Jigs, Fixtures and Production Aids

Week 4 Assistive and Inclusive Design

Week 5 Sustainable Futures and Circular Design

Week 6 Documentation and Version Control

Week 7 Testing Against Criteria

Week 8 Term 3 Prototype Validation

Essential question	How do designers validate decisions and improve outcomes with evidence?
Likely term outcome	formal design proposal, iterative prototype evidence and criteria-based evaluation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 3 • Week 1: Materials Selection and Performance

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind materials selection and performance and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up. Add correct filament storage, avoiding contaminated material and supervising any discussion of fumes or ventilation.

Teacher note

This week's lesson positions "Materials Selection and Performance" inside the term theme of applied problem solving. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

The materials available in any era shape what people can make. From bronze and steel to polymers and composites, manufacturing history is partly a story about learning what materials can do.

Discussion prompts

- How do material choices affect cost, strength, sustainability and print quality?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Materials Selection and Performance" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 3 • Week 2: Quality Assurance and Defect Analysis

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind quality assurance and defect analysis and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Quality Assurance and Defect Analysis" inside the term theme of applied problem solving. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Quality Assurance and Defect Analysis" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 3 • Week 3: Jigs, Fixtures and Production Aids

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind jigs, fixtures and production aids and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Jigs, Fixtures and Production Aids" inside the term theme of applied problem solving. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Jigs, Fixtures and Production Aids" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 3 • Week 4: Assistive and Inclusive Design

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind assistive and inclusive design and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Assistive and Inclusive Design" inside the term theme of applied problem solving. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Assistive and Inclusive Design" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 3 • Week 5: Sustainable Futures and Circular Design

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind sustainable futures and circular design and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Sustainable Futures and Circular Design" inside the term theme of applied problem solving. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

Sustainability is now a design requirement rather than an optional extra. Modern manufacturing increasingly considers waste, energy use, durability, repairability and product life cycle.

Discussion prompts

- When is a 3D print genuinely sustainable, and when is it just convenient?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Sustainable Futures and Circular Design" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 3 • Week 6: Documentation and Version Control

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind documentation and version control and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Documentation and Version Control" inside the term theme of applied problem solving. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Documentation and Version Control" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 3 • Week 7: Testing Against Criteria

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind testing against criteria and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, calipers or rulers, sample test parts
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up. Emphasise controlled testing rather than rough play, and keep fingers clear of load points or snapping parts.

Teacher note

This week's lesson positions "Testing Against Criteria" inside the term theme of applied problem solving. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Testing Against Criteria" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 3 • Week 8: Term 3 Prototype Validation

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind term 3 prototype validation and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students build on the design and planning work from the first half of the year.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Term 3 Prototype Validation" inside the term theme of applied problem solving. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Term 3 Prototype Validation" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 4 • Capstone and Communication

Advanced Level • Term 4

Capstone and Communication

8 core weekly lessons plus flexible school weeks for interruptions, excursions and assessment

Week 1 Selecting a Major Project Brief

Week 2 Concept Development and Evaluation Matrix

Week 3 Detailed Production Planning

Week 4 Evidence-Based Iteration

Week 5 Packaging, Presentation and Communication

Week 6 Final Manufacture and Finishing

Week 7 Formal Evaluation and Reflection

Week 8 Industry-Style Showcase

Essential question	How do we present a serious design project in a credible, industry-style way?
Likely term outcome	formal design proposal, iterative prototype evidence and criteria-based evaluation
Teaching approach	Teacher modelling + guided practice + studio/making time + discussion + reflection

Term 4 • Week 1: Selecting a Major Project Brief

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind selecting a major project brief and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Selecting a Major Project Brief" inside the term theme of capstone and communication. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

Design briefs became important as products and projects grew more complex. A good brief keeps a team focused on real users, real constraints and evidence-based decisions.

Discussion prompts

- What makes a brief useful rather than vague?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Selecting a Major Project Brief" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 4 • Week 2: Concept Development and Evaluation Matrix

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind concept development and evaluation matrix and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Concept Development and Evaluation Matrix" inside the term theme of capstone and communication. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Concept Development and Evaluation Matrix" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 4 • Week 3: Detailed Production Planning

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind detailed production planning and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display, 3D printer, prepared slicer screenshots or demo files
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Detailed Production Planning" inside the term theme of capstone and communication. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Detailed Production Planning" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 4 • Week 4: Evidence-Based Iteration

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind evidence-based iteration and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Evidence-Based Iteration" inside the term theme of capstone and communication. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

Many famous designs only succeeded after repeated testing and revision. Engineering history rewards teams that treat failures as information, not embarrassment.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Evidence-Based Iteration" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 4 • Week 5: Packaging, Presentation and Communication

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind packaging, presentation and communication and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or

	clean-up.
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Teacher note

This week's lesson positions "Packaging, Presentation and Communication" inside the term theme of capstone and communication. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Packaging, Presentation and Communication" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 4 • Week 6: Final Manufacture and Finishing

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind final manufacture and finishing and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful

	workstation behaviour and safe handling of sharp tools used for print removal or clean-up.
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Teacher note

This week's lesson positions "Final Manufacture and Finishing" inside the term theme of capstone and communication. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Final Manufacture and Finishing" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 4 • Week 7: Formal Evaluation and Reflection

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind formal evaluation and reflection and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed prints, projector/display

Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.
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Teacher note

This week's lesson positions "Formal Evaluation and Reflection" inside the term theme of capstone and communication. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Formal Evaluation and Reflection" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.

Term 4 • Week 8: Industry-Style Showcase

Duration	70–90 minutes
Learning intention	Students understand the key ideas behind industry-style showcase and apply them to a design-and-make context appropriate to the advanced pathway.
Success criteria	justify design decisions against explicit criteria including function, safety and sustainability; document production or project-management choices with evidence; critique a solution in terms of performance, user need, cost and risk
Prior knowledge	Students apply knowledge and routines from earlier terms to a more independent final project.
Vocabulary focus	innovation, constraints, DfAM, tolerance, validation, project management, sustainability
Resources	teacher slides or board notes, student design journals, sample printed parts or failed

	prints, projector/display
Safety	Review hot-end/nozzle awareness, moving parts, tidy cable management, respectful workstation behaviour and safe handling of sharp tools used for print removal or clean-up.

Teacher note

This week's lesson positions "Industry-Style Showcase" inside the term theme of capstone and communication. It is written to begin with a motivating hook, move through explicit teaching, and then give students time to think, talk, design or test so the concept feels active rather than abstract.

Background / history hook

This lesson is connected to the broader history of manufacturing and design, where people continually refine tools, materials and processes to solve real problems more effectively.

Discussion prompts

- What would make students care about this problem in the real world?
- Where do we see this issue in homes, schools, sport, health or industry?
- What trade-off matters most here: speed, cost, strength, appearance, waste or safety?
- When does a digital design become 'good enough' to print?

Suggested lesson sequence

1. Launch (5–10 min): present a problem, prototype or case study that makes "Industry-Style Showcase" feel authentic and debatable.
2. Teach and model (10–15 min): explicitly unpack the concept, relevant vocabulary and one professional example from design or manufacturing.
3. Analysis/guided task (10–15 min): students interpret evidence, compare solutions or plan the next design step using a scaffold.
4. Studio/making time (20–30 min): students design, test, document or refine their work while the teacher conferences with individuals or groups.
5. Exit/reflection (5–10 min): students justify a decision, identify a trade-off or set the next milestone.

Assessment and differentiation

Assessment: Assess design briefs, concept development, prototype testing, production planning and evaluation against criteria. Differentiation: Provide milestone checkpoints and planning templates for students who need them. Extend highly capable students through tighter constraints, client-style review feedback or a formal test protocol.